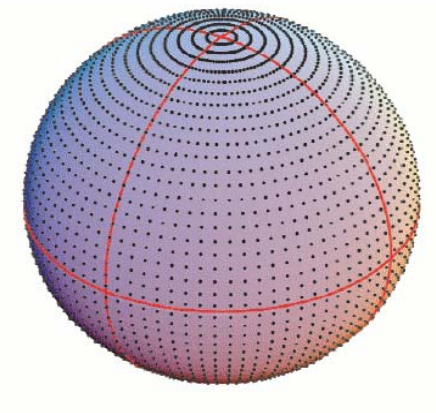
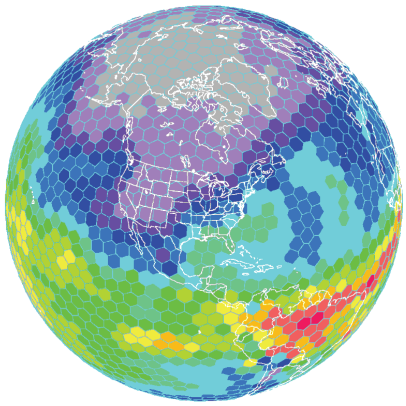
# Earth System Research Laboratory (ESRL)
# Global Systems Division (GSD)

*Putting tools in the hands of users*
*Making a Difference in Weather and Climate Prediction*

The NIM is an atmospheric model that is specifically designed to improve weather prediction for all latitudes including tropical regions.



Depicted above is a traditional model that does not have constant resolution over the entire globe, and is thus less accurate and efficient than the NIM that is currently in development.



ESRL has successfully developed this hydrostatic Flow-following Icosahedral Model (FIM), now being tested for future use by the National Weather Service. NIM is the non-hydrostatic enhanced extension of FIM that achieves greater prediction accuracy.

## Non-hydrostatic Icosahedral Model (NIM)

The NIM is a next-generation global non-hydrostatic atmospheric model being developed to improve all aspects of NOAA's global mission. Specifically, it is designed to improve weather prediction for all latitudes including tropical regions. NIM will be used to explicitly resolve tropical convective clouds, because these types of clouds have been identified as a major source of uncertainty in climate simulations. With the NIM, we seek to improve accuracy for short-range, high-impact weather forecasts to longer-term intra-seasonal climate prediction. Such improvement is essential to NOAA's mission in weather forecasting and understanding climate variability.

## Why Develop the NIM?

- Technological Advancement: NIM uses the latest numerical innovation of finite-volume model formulations on an icosahedral (20-sided) grid to improve model accuracy and efficiency to meet NOAA's future predictions mission at very high resolution that traditional weather models are unable to meet.
- Accuracy: Accurate weather forecast and climate prediction depend on faithful descriptions of multi-scale physical processes. These require a non-hydrostatic model to run efficiently at very high resolution to accurately simulate real atmospheric phenomena that ranges from severely convective storms to natural long-term variability.
- Efficiency: To meet NOAA's future weather and climate prediction goals, next-generation weather models are required to run at very high resolution which demand enormous computational power. NIM is a benchmark model used to explore the next generation high-performance computer architectures specifically designed for future high-resolution models.

*Continuous cutting-edge model developments are required to meet future challenges in weather and climate prediction including those related to devestating tropical storms.*

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